CERTIFICATE OF ANALYSIS

REPORTED TO	Alto Utilities Ltd. 10989 Maddock Avenue LAKE COUNTRY, BC V4V 2J5		
ATTENTION	Brian Gutlcnecht	**WORK ORDER**	9090718
PO NUMBER		**RECEIVED / TEMP**	2019-09-09 14:54 / 16°C
PROJECT	Water Bacteriology	**REPORTED**	2019-09-17 10:55
PROJECT INFO	No Project	**COC NUMBER**	B82839

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

Work Order Comments:

This is a revised report; please refer to Appendix 3 for details.

If you have any questions or concerns, please contact me at teamcaro@caro.ca

Authorized By:

Team CARO
Client Service Representative

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Alto Utilities Ltd.	**WORK ORDER**	9090718
PROJECT	Water Bacteriology	**REPORTED**	2019-09-17 10:55

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
1 - Velda - Distrubution (9090718-01) | Matrix: Water | Sampled: 2019-09-09 14:25						
Anions						
Chloride	**64.5**	AO ≤ 250	0.10	mg/L	2019-09-11	
Fluoride	**0.26**	MAC = 1.5	0.10	mg/L	2019-09-10	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2019-09-10	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2019-09-10	
Sulfate	**67.4**	AO ≤ 500	1.0	mg/L	2019-09-10	
Calculated Parameters						
Hardness, Total (as CaCO3)	**362**	None Required	0.500	mg/L	N/A	
Langelier Index	**1.0**	N/A	-5.0		2019-09-16	
Solids, Total Dissolved	**492**	AO ≤ 500	1.00	mg/L	N/A	
General Parameters						
Alkalinity, Total (as CaCO3)	**298**	N/A	1.0	mg/L	2019-09-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2019-09-11	
Alkalinity, Bicarbonate (as CaCO3)	**298**	N/A	1.0	mg/L	2019-09-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2019-09-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2019-09-11	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2019-09-10	
Conductivity (EC)	**861**	N/A	2.0	µS/cm	2019-09-11	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2019-09-12	
pH	**8.02**	7.0-10.5	0.10	pH units	2019-09-11	HT2
Temperature, at pH	**23.4**	N/A		°C	2019-09-11	HT2
Turbidity	**0.29**	OG < 1	0.10	NTU	2019-09-09	
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2019-09-09	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2019-09-09	
Total Metals						
Aluminum, total	< 0.0050	OG < 0.1	0.0050	mg/L	2019-09-13	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2019-09-13	
Arsenic, total	**0.00075**	MAC = 0.01	0.00050	mg/L	2019-09-13	
Barium, total	**0.0604**	MAC = 1	0.0050	mg/L	2019-09-13	
Boron, total	**0.0380**	MAC = 5	0.0050	mg/L	2019-09-13	
Cadmium, total	**0.000017**	MAC = 0.005	0.000010	mg/L	2019-09-13	
Calcium, total	**89.5**	None Required	0.20	mg/L	2019-09-13	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2019-09-13	
Cobalt, total	**0.00018**	N/A	0.00010	mg/L	2019-09-13	
Copper, total	**0.0595**	MAC = 2	0.00040	mg/L	2019-09-13	
Iron, total	**0.041**	AO ≤ 0.3	0.010	mg/L	2019-09-13	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2019-09-13	
Magnesium, total	**33.5**	None Required	0.010	mg/L	2019-09-13	
Manganese, total	**0.0759**	MAC = 0.12	0.00020	mg/L	2019-09-13	
Mercury, total	< 0.000040	MAC = 0.001	0.000040	mg/L	2019-09-13	CT5

CARO ANALYTICAL SERVICES

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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
1 - Velda - Distrubution (9090718-01) | Matrix: Water | Sampled: 2019-09-09 14:25, Continued						
Total Metals, Continued						
Molybdenum, total	**0.00524**	N/A	0.00010	mg/L	2019-09-13	
Nickel, total	**0.00244**	N/A	0.00040	mg/L	2019-09-13	
Potassium, total	**5.19**	N/A	0.10	mg/L	2019-09-13	
Selenium, total	**0.00212**	MAC = 0.05	0.00050	mg/L	2019-09-13	
Sodium, total	**50.7**	AO ≤ 200	0.10	mg/L	2019-09-13	
Strontium, total	**0.749**	7	0.0010	mg/L	2019-09-13	
Uranium, total	**0.0138**	MAC = 0.02	0.000020	mg/L	2019-09-13	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2019-09-13	
1 - Lodge Road 30 Pump - North Well (9090718-02) | Matrix: Water | Sampled: 2019-09-09 14:00						
Anions						
Chloride	**65.0**	AO ≤ 250	0.10	mg/L	2019-09-11	
Fluoride	**0.25**	MAC = 1.5	0.10	mg/L	2019-09-10	
Nitrate (as N)	**0.696**	MAC = 10	0.010	mg/L	2019-09-10	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2019-09-10	
Sulfate	**67.1**	AO ≤ 500	1.0	mg/L	2019-09-10	
Calculated Parameters						
Hardness, Total (as CaCO3)	**362**	None Required	0.500	mg/L	N/A	
Langelier Index	**1.1**	N/A	-5.0		2019-09-16	
Solids, Total Dissolved	**494**	AO ≤ 500	1.00	mg/L	N/A	
General Parameters						
Alkalinity, Total (as CaCO3)	**296**	N/A	1.0	mg/L	2019-09-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2019-09-11	
Alkalinity, Bicarbonate (as CaCO3)	**296**	N/A	1.0	mg/L	2019-09-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2019-09-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2019-09-11	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2019-09-10	
Conductivity (EC)	**862**	N/A	2.0	µS/cm	2019-09-11	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2019-09-12	
pH	**8.07**	7.0-10.5	0.10	pH units	2019-09-11	HT2
Temperature, at pH	**23.4**	N/A		°C	2019-09-11	HT2
Turbidity	**1.22**	OG < 1	0.10	NTU	2019-09-09	
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2019-09-09	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2019-09-09	
Total Metals						
Aluminum, total	< 0.0050	OG < 0.1	0.0050	mg/L	2019-09-13	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2019-09-13	

TEST RESULTS

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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
1 - Lodge Road 30 Pump - North Well (9090718-02) | Matrix: Water | Sampled: 2019-09-09 14:00, Continued						
Total Metals, Continued						
Arsenic, total	**0.00099**	MAC = 0.01	0.00050	mg/L	2019-09-13	
Barium, total	**0.0614**	MAC = 1	0.0050	mg/L	2019-09-13	
Boron, total	**0.0383**	MAC = 5	0.0050	mg/L	2019-09-13	
Cadmium, total	**0.000022**	MAC = 0.005	0.000010	mg/L	2019-09-13	
Calcium, total	**90.2**	None Required	0.20	mg/L	2019-09-13	
Chromium, total	**0.00084**	MAC = 0.05	0.00050	mg/L	2019-09-13	
Cobalt, total	**0.00022**	N/A	0.00010	mg/L	2019-09-13	
Copper, total	< 0.00040	MAC = 2	0.00040	mg/L	2019-09-13	
Iron, total	**0.189**	AO ≤ 0.3	0.010	mg/L	2019-09-13	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2019-09-13	
Magnesium, total	**33.0**	None Required	0.010	mg/L	2019-09-13	
Manganese, total	**0.103**	MAC = 0.12	0.00020	mg/L	2019-09-13	
Mercury, total	< 0.000040	MAC = 0.001	0.000040	mg/L	2019-09-13	CT5
Molybdenum, total	**0.00521**	N/A	0.00010	mg/L	2019-09-13	
Nickel, total	**0.00243**	N/A	0.00040	mg/L	2019-09-13	
Potassium, total	**5.10**	N/A	0.10	mg/L	2019-09-13	
Selenium, total	**0.00206**	MAC = 0.05	0.00050	mg/L	2019-09-13	
Sodium, total	**49.5**	AO ≤ 200	0.10	mg/L	2019-09-13	
Strontium, total	**0.744**	7	0.0010	mg/L	2019-09-13	
Uranium, total	**0.0139**	MAC = 0.02	0.000020	mg/L	2019-09-13	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2019-09-13	

Sample Qualifiers:

CT5	This sample has been incorrectly preserved for Mercury analysis
HT2	The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Alto Utilities Ltd.	**WORK ORDER**	9090718
PROJECT	Water Bacteriology	**REPORTED**	2019-09-17 10:55

Analysis Description	Method Ref.	Technique	Location
Alkalinity in Water	SM 2320 B* (2017)	Titration with H2SO4	Kelowna
Anions in Water	SM 4110 B (2017)	Ion Chromatography	Kelowna
Coliforms, Total in Water	SM 9222* (2017)	Membrane Filtration / Chromocult Agar	Kelowna
Colour, True in Water	SM 2120 C (2017)	Spectrophotometry (456 nm)	Kelowna
Conductivity in Water	SM 2510 B (2017)	Conductivity Meter	Kelowna
Cyanide, SAD in Water	ASTM D7511-12	Flow Injection with In-Line UV Digestion and Amperometry	Kelowna
E. coli in Water	SM 9222* (2017)	Membrane Filtration / Chromocult Agar	Kelowna
Hardness in Water	SM 2340 B* (2017)	Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)	N/A
Langelier Index in Water	SM 2330 B (2017)	Calculation	N/A
pH in Water	SM 4500-H+ B (2017)	Electrometry	Kelowna
Solids, Total Dissolved in Water	SM 1030 E (2017)	SM 1030 E (2011)	N/A
Total Metals in Water	EPA 200.2* / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Turbidity in Water	SM 2130 B (2017)	Nephelometry	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
°C	Degrees Celcius
AO	Aesthetic Objective
CFU/100 mL	Colony Forming Units per 100 millilitres
CU	Colour Units (referenced against a platinum cobalt standard)
MAC	Maximum Acceptable Concentration (health based)
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
OG	Operational Guideline (treated water)
pH units	pH < 7 = acidic, ph > 7 = basic
µS/cm	Microsiemens per centimetre
ASTM	ASTM International Test Methods
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

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General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing. The quality control (QC) data is available upon request

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:teamcaro@caro.ca

APPENDIX 3: REVISION HISTORY

REPORTED TO	Alto Utilities Ltd.	**WORK ORDER**	9090718
PROJECT	Water Bacteriology	**REPORTED**	2019-09-17 10:55

Sample ID	Changed	Change	Analysis	Analyte(s)
9090718-01	2019-09-17	Sample ID	N/A	N/A
9090718-02	2019-09-17	Sample ID	N/A	N/A